

Updated Projections for South Atlantic
Blueline Tilefish SEDAR 32 Stock Assessment

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This document responds to an August 14, 2015 request and an August 18, 2015 request for additional projections for Blueline Tilefish. The August 14 memo requested additional information about projections previously provided on August 11, 2015. The August 18 memo requested that different landings values be used for the interim years of the projections (2012-2015), and that the additional information previously requested be provided for these new projections rather than those previously provided.

Four sets of P^* projections were prepared in response to this request. These included $P^* = 0.3$ and $P^* = 0.5$ projections from 2016-2020 in pounds and number for landings and discards with a 4 year interim period (2012-2015). The projections are identical in structure to those described in previous documents and the SEDAR 32 Blueline Tilefish assessment, except that alternative landings values were used for the interim years (2012-2015).

The first set of projections (Set 1) used the landings values provided in the August 18 memo (2012 = 516,885 lb, 2013 = 577,747 lb, 2014 = 550,786 lb, 2015 = 111,178 lb). A follow-up email (dated August 20, 2015) requested that the 2015 value be updated to 178,272 lb only if the projections had not been started. Because the projections had already been started at the time this modification to the request was received, 2015 landings were left at the originally requested value (111,178 lb).

The second set of projections (Set 2) used the Southeast Fisheries Science Center (SEFSC) landings based on data available in August 2015 (2012 = 465,518 lb, 2013 = 613,934 lb, 2014 = 435,052 lb, 2015 = 150,429 lb). These included commercial landings from handline, longline, and 'other' categories, recreational landings from MRIP, and headboat landings from the Southeast Regional Headboat survey. These landings sources are consistent with queries done in support of prior projections.

Prior to the April 28, 2014 SSC meeting, questions arose about the validity of the 2013 MRIP recreational blueline landings (see April 28, 2014 document). Reported MRIP landings in 2013 were 310,368 lb which is 4-5 times higher than MRIP landings in prior years. To address the unusually high 2013 MRIP value, the SEFSC prepared projections using both the reported 2013 MRIP landings (310,368 lb) and an alternative 2013 value that was the average MRIP landings for 2010 and 2012 (71,466; 2011 was excluded from the average due to the deepwater closure) (see the April 28, 2014 document). Subsequent to the April 2014 meeting, the SSC provided an alternative value for 2013 MRIP landings that was between that originally reported and the average of 2010 and 2012 (252,094 lb). The third set of projections (Set 3) used the SEFSC landings for the interim period with the average MRIP landings for 2010 and 2012 in place of the 2013 reported MRIP value. The fourth set of projections (Set 4) used the SEFSC landings for the interim period with the alternative value provided by the SSC in place of the 2013 reported MRIP value.

Results of the four projection scenarios are shown in Fig. 1 and in Tables 1-8.

Comments on Projections:

- Projections of fish stocks are highly uncertain, particularly in the long-term (> 3 years). The current projections assume an interim period of 4 years beyond the terminal year of the assessment (2011) and then project an additional 5 years (9 year projections). Changes in the population of Blueline Tilefish, the various fisheries, and the effects of management regulations beyond the terminal year of the assessment are not reflected in these projections.

- The landings provided in the August 18 memo differ considerably (6-35%) from those provided by the SEFSC that have been used in all prior projections. The source of this difference is unclear. The alternative landings values for the interim period do not affect the qualitative pattern of the projections, but do result in some quantitative differences (Fig. 1).
- The projection model underestimated the observed 2014 landings for projection set 1 and projection set 2 (Fig. 1). This was due to the high estimated landings in 2013 and the model constraint that annual F remain below 5. Projection sets 3 and 4 using alternative values for 2013 MRIP landings from prior projection scenarios (see April 28, 2014 document) did match the 2014 landings.
- Landings during the projection period (2016-2020) are similar for different assumed interim period landings.

Figure 1. P* projections for the four scenarios described above.

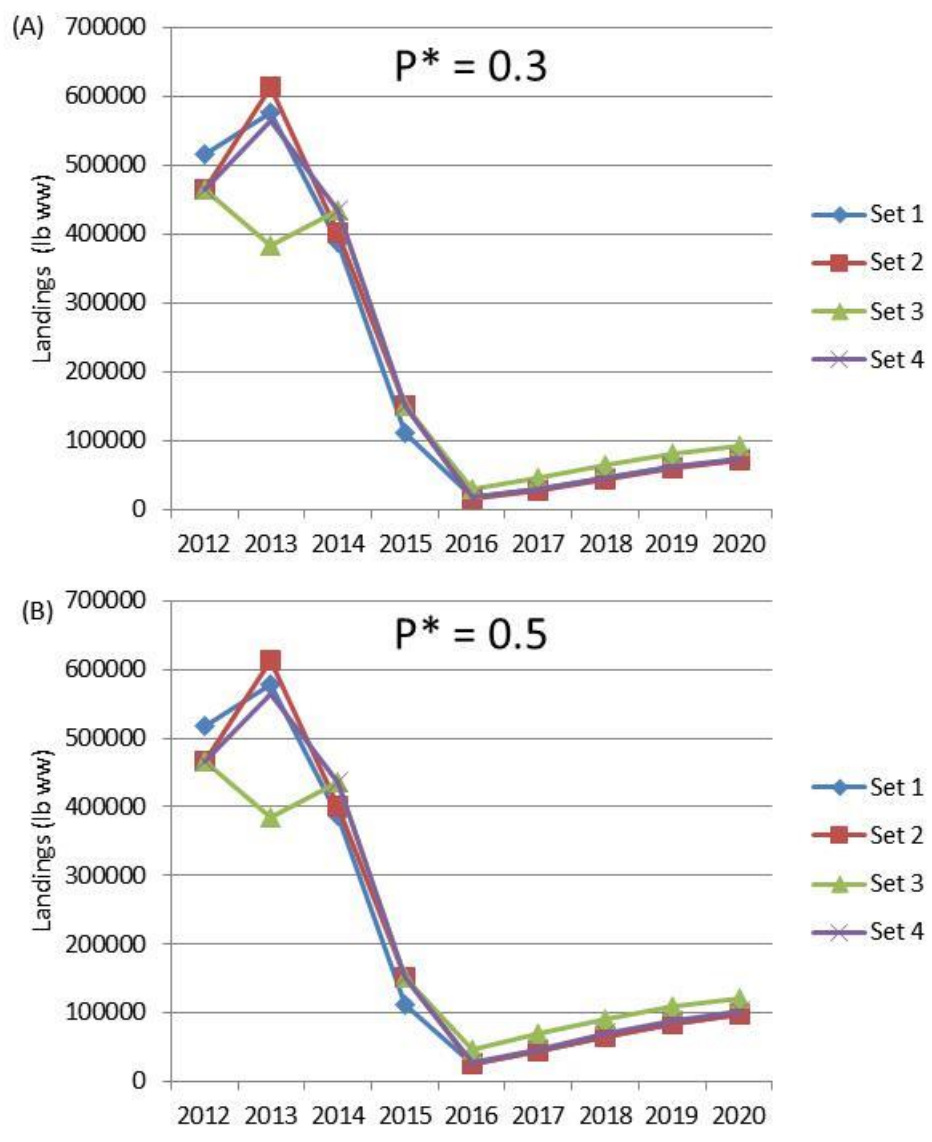


Table 1. Acceptable biological catch (ABC) of blueline tilefish based on the annual probability of overfishing $P^* = 0.3$. Landings were set to those observed for 2012 through 2015, with the ABC associated with the specified probability of overfishing calculated for the remaining years (2016-2020). Observed landings for the interim period were those provided in the August 18, 2015 memo: 2012 = 516,885 lb, 2013 = 577,747 lb, 2014 = 550,786 lb, and 2015 = 111,178 lb. F = fishing mortality rate (per yr), SSB = mid-year spawning stock biomass (mature female biomass in metric tons whole weight), $\text{Pr}(\text{SSB} > \text{SSB}_{\text{MSY}})$ = proportion of replicates where SSB was above the point estimate of $\text{SSB}_{\text{MSY}} = 246.6$ mt, B = biomass (mt), R = recruits (1000 age-1 fish). Annual ABCs are a single quantity while other values presented are medians. L=landings, D=Discards.

Year	F	Pr(F > F _{msy})	SSB	Pr(SSB > SSB _{msy})	B	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.30	0.98	189.614	0.07	625.442	108.304	NA	NA	NA	NA
2013	2.96	1.00	117.650	0.02	503.091	106.751	NA	NA	NA	NA
2014	4.99	1.00	71.059	0.01	347.678	89.225	NA	NA	NA	NA
2015	1.62	0.98	68.073	0.01	253.182	71.034	NA	NA	NA	NA
2016	0.151	0.30	89.360	0.02	271.601	69.112	17.375	0.190	4.150	0.045
2017	0.150	0.30	117.907	0.03	332.547	76.765	30.753	0.336	6.627	0.072
2018	0.148	0.30	141.402	0.06	389.874	85.091	46.400	0.507	9.309	0.102
2019	0.106	0.30	162.530	0.12	443.971	91.541	61.229	0.668	11.628	0.127
2020	0.142	0.30	182.233	0.22	493.397	93.239	72.511	0.792	13.190	0.144

Table 2. Acceptable biological catch (ABC) of blueline tilefish based on the annual probability of overfishing $P^* = 0.5$. Landings were set to those observed for 2012 through 2015, with the ABC associated with the specified probability of overfishing calculated for the remaining years (2016-2020). Observed landings for the interim period were those provided in the August 18, 2015 memo: 2012 = 516,885 lb, 2013 = 577,747 lb, 2014 = 550,786 lb, and 2015 = 111,178 lb. F = fishing mortality rate (per yr), SSB = mid-year spawning stock biomass (mature female biomass in metric tons whole weight), $\text{Pr}(\text{SSB} > \text{SSB}_{\text{MSY}})$ = proportion of replicates where SSB was above the point estimate of $\text{SSB}_{\text{MSY}} = 246.6$ mt, B = biomass (mt), R = recruits (1000 age-1 fish). Annual ABCs are a single quantity while other values presented are medians. L=landings, D=Discards.

Year	F	$\text{Pr}(F > F_{\text{msy}})$	SSB	$\text{Pr}(\text{SSB} > \text{SSB}_{\text{msy}})$	B	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.30	0.98	189.614	0.07	625.442	108.304	NA	NA	NA	NA
2013	2.96	1.00	117.650	0.02	503.091	106.751	NA	NA	NA	NA
2014	4.99	1.00	71.059	0.01	347.678	89.225	NA	NA	NA	NA
2015	1.62	0.98	68.073	0.01	253.182	71.034	NA	NA	NA	NA
2016	0.232	0.50	88.606	0.02	271.601	69.112	26.186	0.286	6.271	0.068
2017	0.230	0.50	114.845	0.03	328.520	76.531	44.902	0.490	9.746	0.106
2018	0.227	0.50	135.013	0.05	379.601	84.146	65.626	0.716	13.303	0.145
2019	0.224	0.50	151.628	0.10	424.432	89.873	83.970	0.917	16.183	0.177
2020	0.221	0.50	166.612	0.16	464.147	90.531	97.400	1.063	18.044	0.197

Table 3. Acceptable biological catch (ABC) of blueline tilefish based on the annual probability of overfishing $P^* = 0.3$. Landings were set to those observed for 2012 through 2015, with the ABC associated with the specified probability of overfishing calculated for the remaining years (2016-2020). Observed landings for the interim period were those provided by the SEFSC: 2012 = 465,518 lb, 2013 = 613,934 lb, 2014 = 435,052 lb, and 2015 = 150,429 lb. F = fishing mortality rate (per yr), SSB = mid-year spawning stock biomass (mature female biomass in metric tons whole weight), $\text{Pr}(\text{SSB} > \text{SSB}_{\text{MSY}})$ = proportion of replicates where SSB was above the point estimate of $\text{SSB}_{\text{MSY}} = 246.6$ mt, B = biomass (mt), R = recruits (1000 age-1 fish). Annual ABCs are a single quantity while other values presented are medians. L=landings, D=Discards.

Year	F	$\text{Pr}(F > F_{\text{msy}})$	SSB	$\text{Pr}(\text{SSB} > \text{SSB}_{\text{msy}})$	B	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.11	0.97	196.093	0.08	625.442	108.304	NA	NA	NA	NA
2013	2.88	1.00	123.101	0.02	524.531	107.769	NA	NA	NA	NA
2014	4.99	1.00	73.986	0.01	355.648	90.744	NA	NA	NA	NA
2015	2.28	0.98	67.962	0.01	264.020	73.325	NA	NA	NA	NA
2016	0.149	0.30	86.706	0.02	268.758	69.404	15.597	0.170	3.788	0.041
2017	0.147	0.30	116.212	0.04	330.803	76.636	28.415	0.310	6.184	0.068
2018	0.146	0.30	140.741	0.08	389.411	84.689	44.079	0.481	8.900	0.097
2019	0.143	0.30	162.113	0.15	444.727	91.448	59.003	0.644	11.262	0.123
2020	0.139	0.30	182.810	0.24	497.788	93.269	70.959	0.775	12.944	0.141

Table 4. Acceptable biological catch (ABC) of blueline tilefish based on the annual probability of overfishing $P^* = 0.5$. Landings were set to those observed for 2012 through 2015, with the ABC associated with the specified probability of overfishing calculated for the remaining years (2016-2020). Observed landings for the interim period were those provided by the SEFSC: 2012 = 465,518 lb, 2013 = 613,934 lb, 2014 = 435,052 lb, and 2015 = 150,429 lb. F = fishing mortality rate (per yr), SSB = mid-year spawning stock biomass (mature female biomass in metric tons whole weight), $\Pr(SSB > SSB_{MSY})$ = proportion of replicates where SSB was above the point estimate of $SSB_{MSY} = 246.6$ mt, B = biomass (mt), R = recruits (1000 age-1 fish). Annual ABCs are a single quantity while other values presented are medians. L=landings, D=Discards.

Year	F	$\Pr(F > F_{msy})$	SSB	$\Pr(SSB > SSB_{msy})$	B	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.11	0.97	196.093	0.08	625.442	108.304	NA	NA	NA	NA
2013	2.88	1.00	123.101	0.02	524.531	107.769	NA	NA	NA	NA
2014	4.99	1.00	73.986	0.01	355.648	90.744	NA	NA	NA	NA
2015	2.28	0.98	67.962	0.01	264.920	73.325	NA	NA	NA	NA
2016	0.241	0.50	85.935	0.02	268.758	69.404	24.867	0.271	6.060	0.066
2017	0.226	0.50	113.001	0.04	326.543	76.279	43.369	0.473	9.518	0.104
2018	0.231	0.50	133.887	0.07	378.419	83.810	64.150	0.700	13.106	0.143
2019	0.226	0.50	150.849	0.12	424.931	89.745	82.913	0.905	16.045	0.175
2020	0.220	0.50	166.396	0.18	467.058	90.772	96.733	1.056	17.966	0.196

Table 5. Acceptable biological catch (ABC) of blueline tilefish based on the annual probability of overfishing $P^* = 0.3$. Landings were set to those observed for 2012 through 2015, with the ABC associated with the specified probability of overfishing calculated for the remaining years (2016-2020). Observed landings for the interim period were those provided by the SEFSC with an average value (2010 and 2012) used for MRIP 2013 landings: 2012 = 465,518 lb, 2013 = 383,725 lb, 2014 = 435,052 lb, and 2015 = 150,429 lb. F = fishing mortality rate (per yr), SSB = mid-year spawning stock biomass (mature female biomass in metric tons whole weight), $\text{Pr}(\text{SSB} > \text{SSB}_{\text{MSY}})$ = proportion of replicates where SSB was above the point estimate of $\text{SSB}_{\text{MSY}} = 246.6$ mt, B = biomass (mt), R = recruits (1000 age-1 fish). Annual ABCs are a single quantity while other values presented are medians. L=landings, D=Discards.

Year	F	$\text{Pr}(F > F_{\text{msy}})$	SSB	$\text{Pr}(\text{SSB} > \text{SSB}_{\text{msy}})$	B	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.11	0.97	196.093	0.08	625.442	108.304	NA	NA	NA	NA
2013	1.23	0.98	156.883	0.03	524.531	107.769	NA	NA	NA	NA
2014	2.40	0.99	115.031	0.02	453.089	99.204	NA	NA	NA	NA
2015	1.02	0.93	105.623	0.02	354.563	86.010	NA	NA	NA	NA
2016	0.137	0.30	126.977	0.04	369.661	82.416	29.027	0.317	6.372	0.070
2017	0.141	0.30	157.435	0.10	433.817	87.974	45.941	0.502	9.356	0.102
2018	0.142	0.30	182.783	0.19	493.417	94.040	63.559	0.694	12.222	0.133
2019	0.142	0.30	203.502	0.29	544.426	99.740	79.856	0.872	14.667	0.160
2020	0.141	0.30	221.758	0.40	590.566	100.669	92.511	1.010	16.367	0.179

Table 6. Acceptable biological catch (ABC) of blueline tilefish based on the annual probability of overfishing $P^* = 0.5$. Landings were set to those observed for 2012 through 2015, with the ABC associated with the specified probability of overfishing calculated for the remaining years (2016-2020). Observed landings for the interim period were those provided by the SEFSC with an average value (2010 and 2012) used for MRIP 2013 landings: 2012 = 465,518 lb, 2013 = 383,725 lb, 2014 = 435,052 lb, and 2015 = 150,429 lb. F = fishing mortality rate (per yr), SSB = mid-year spawning stock biomass (mature female biomass in metric tons whole weight), $\text{Pr}(\text{SSB} > \text{SSB}_{\text{MSY}})$ = proportion of replicates where SSB was above the point estimate of $\text{SSB}_{\text{MSY}} = 246.6$ mt, B = biomass (mt), R = recruits (1000 age-1 fish). Annual ABCs are a single quantity while other values presented are medians. L=landings, D=Discards.

Year	F	$\text{Pr}(F > F_{\text{msy}})$	SSB	$\text{Pr}(\text{SSB} > \text{SSB}_{\text{msy}})$	B	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.11	0.97	196.093	0.08	625.442	108.304	NA	NA	NA	NA
2013	1.23	0.98	156.883	0.03	524.531	107.769	NA	NA	NA	NA
2014	2.40	0.99	115.031	0.02	453.089	99.204	NA	NA	NA	NA
2015	1.02	0.93	105.623	0.02	354.563	86.010	NA	NA	NA	NA
2016	0.225	0.50	125.462	0.04	369.661	82.416	46.489	0.508	10.240	0.112
2017	0.224	0.50	151.933	0.09	426.176	87.505	68.630	0.749	14.087	0.154
2018	0.223	0.50	172.370	0.16	475.470	92.942	90.265	0.986	17.561	0.192
2019	0.221	0.50	187.469	0.23	515.879	97.751	108.489	1.184	20.250	0.221
2020	0.218	0.50	200.885	0.30	550.658	97.493	121.922	1.331	21.996	0.240

Table 7. Acceptable biological catch (ABC) of blueline tilefish based on the annual probability of overfishing $P^* = 0.3$. Landings were set to those observed for 2012 through 2015, with the ABC associated with the specified probability of overfishing calculated for the remaining years (2016-2020). Observed landings for the interim period were those provided by the SEFSC with an alternative value (provided by the SSC) used for MRIP 2013 landings: 2012 = 465,518 lb, 2013 = 564,353 lb, 2014 = 435,052 lb, and 2015 = 150,429 lb. F = fishing mortality rate (per yr), SSB = mid-year spawning stock biomass (mature female biomass in metric tons whole weight), $\text{Pr}(\text{SSB} > \text{SSB}_{\text{MSY}})$ = proportion of replicates where SSB was above the point estimate of $\text{SSB}_{\text{MSY}} = 246.6$ mt, B = biomass (mt), R = recruits (1000 age-1 fish). Annual ABCs are a single quantity while other values presented are medians. L=landings, D=Discards.

Year	F	$\text{Pr}(F > F_{\text{msy}})$	SSB	$\text{Pr}(\text{SSB} > \text{SSB}_{\text{msy}})$	B	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.11	0.97	196.093	0.08	625.442	108.306	NA	NA	NA	NA
2013	2.40	1.00	131.260	0.02	524.531	107.769	NA	NA	NA	NA
2014	4.79	1.00	79.599	0.01	376.621	93.100	NA	NA	NA	NA
2015	2.07	0.97	73.019	0.01	278.545	75.544	NA	NA	NA	NA
2016	0.147	0.30	92.801	0.02	283.181	71.789	17.181	0.188	4.112	0.045
2017	0.146	0.30	122.966	0.05	346.729	78.950	30.753	0.336	6.629	0.072
2018	0.144	0.30	147.806	0.10	407.442	86.816	46.842	0.511	9.396	0.103
2019	0.143	0.30	169.872	0.18	463.117	93.115	62.307	0.680	11.825	0.129
2020	0.139	0.30	190.421	0.27	515.260	94.370	74.409	0.812	13.505	0.147

Table 8. Acceptable biological catch (ABC) of blueline tilefish based on the annual probability of overfishing $P^* = 0.5$. Landings were set to those observed for 2012 through 2015, with the ABC associated with the specified probability of overfishing calculated for the remaining years (2016-2020). Observed landings for the interim period were those provided by the SEFSC with an alternative value (provided by the SSC) used for MRIP 2013 landings: 2012 = 465,518 lb, 2013 = 564,353 lb, 2014 = 435,052 lb, and 2015 = 150,429 lb. F = fishing mortality rate (per yr), SSB = mid-year spawning stock biomass (mature female biomass in metric tons whole weight), $\text{Pr}(\text{SSB} > \text{SSB}_{\text{MSY}})$ = proportion of replicates where SSB was above the point estimate of $\text{SSB}_{\text{MSY}} = 246.6$ mt, B = biomass (mt), R = recruits (1000 age-1 fish). Annual ABCs are a single quantity while other values presented are medians. L=landings, D=Discards.

Year	F	$\text{Pr}(F > F_{\text{msy}})$	SSB	$\text{Pr}(\text{SSB} > \text{SSB}_{\text{msy}})$	B	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.11	0.97	196.093	0.08	625.442	108.304	NA	NA	NA	NA
2013	2.40	1.00	131.260	0.02	524.531	107.769	NA	NA	NA	NA
2014	4.79	1.00	79.600	0.01	376.621	93.100	NA	NA	NA	NA
2015	2.07	0.97	73.019	0.01	278.545	75.544	NA	NA	NA	NA
2016	0.243	0.50	91.914	0.02	283.181	71.789	27.748	0.303	6.663	0.073
2017	0.237	0.50	119.357	0.04	342.013	78.546	47.092	0.514	10.235	0.112
2018	0.230	0.50	140.258	0.09	395.331	85.855	68.308	0.746	13.854	0.151
2019	0.226	0.50	157.643	0.14	441.347	91.185	87.187	0.952	16.784	0.183
2020	0.221	0.50	172.939	0.21	483.692	92.236	101.032	1.103	18.668	0.204